IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claim 1 (Canceled).

2. (currently amended) The method of controlling a storage system according to claim 3, wherein the step of ~~storing~~ controlling by the third storage device to store ~~the write history of the data written in the first storage volume as~~ the first differential management table ~~after the first time~~ comprises the steps of:

~~allowing~~ controlling by the third storage device to compare time set in a data write request received from the first storage device with the first time; and

~~allowing~~ controlling by the third storage device to store the write history of the data in the first differential management table when the write time set in the data write request received from the first storage device is later than the first time.

3. (currently amended)A method of controlling a storage system comprising a first storage device having a first storage volume provided at a first site, a second storage device having a second storage volume provided at a second site, and a third storage device having a third storage volume provided at a third site, ~~the storage devices being connected so as to communicate with each other,~~ wherein the method includes the steps of:

storing a copy of data stored in the first storage volume in the second storage volume with an asynchronous remote copy procedure ~~at a first time~~;

writing the copy of data written in the first storage volume into the third storage volume with a synchronous copy procedure;

~~storing, in the third storage device, a write history of the data written in the first storage volume as a first differential management table after the first time;~~

relating data written in the first storage volume after a first time to a storage area of the first storage device;

~~allowing~~ controlling by the third storage device to store [~~the~~]a first differential management table on which ~~the~~ a write history of the data written in the first storage volume is recorded after the first time and a second differential management table on which ~~the~~ a write history of the data written in the first storage volume is recorded after a second time subsequent to the first time;

transferring data related to the storage area of the first storage device from the first storage device to the second storage device with the asynchronous remote copy procedure after the second time; and

~~allowing~~ controlling by the third storage device to make contents of the data stored in the second storage volume consistent with contents of the data stored in the ~~first~~ third storage volume by using the first differential management table and the third storage volume of the third storage device, if the first site has a disaster.

Claim 4 (Canceled).

5. (currently amended) The storage system according to claim 6, wherein ~~the means for storing the write history of the data written in the first storage volume as the first differential management table after the first time comprises~~:

the third storage device ~~means for allowing the third storage device to~~ compares time set in a data write request received from the first storage device with the first time; and

the third storage device ~~means for allowing the third storage device to~~ stores the write history of the data in the first differential management table when the write time set in the data write request received from the first storage device is later than the first time.

6. (currently Amended) A storage system comprising a first storage device having a first storage volume provided at a first site, a second storage device having a second storage volume provided at a second site, and a third storage device having a third storage volume provided at a third site, ~~the storage devices being connected so as to communicate with each other,~~ wherein the system comprises:

the first storage device ~~means~~ for storing a copy of data stored in the first storage volume in the second storage volume with an asynchronous remote copy procedure~~at a first time~~;

the first storage device ~~means~~ for writing the copy of data written in the first storage volume into the third storage volume with a synchronous copy procedure;

~~means for storing, in the third storage device, a write history of the data written in the first storage volume as a first differential management table after the first time~~;

the third storage device ~~means~~ for ~~allowing the third storage device to~~ controlling to store ~~the~~ a first differential management table on which ~~the~~ a plurality of write ~~history~~ histories of the data written several times in the first storage volume is recorded after ~~the~~ a first time and a second differential management table on which ~~the~~ a plurality of write ~~history~~ histories of the data written several times in the first storage volume is recorded after a second time subsequent to the first time;

a storage area, in the first storage device, is related to data written in the first storage volume after a first time;

the first storage device for controlling to transfer data related to the storage area of the first storage device from the first storage device to the second storage device with the asynchronous remote copy procedure after the second time; and

the third storage device ~~means~~ for ~~allowing the third storage device to make~~ making contents of the data stored in the second storage volume consistent with contents of the data stored in the ~~first~~ third storage volume by using the first differential management table and the third storage volume of the third storage device in the event of a disaster that affects the first site.

7. (currently amended)A storage ~~device~~ system, comprising:

a first disk array system, in a primary site, coupled to a host computer and having a plurality of first disk drive units in which data are stored and a

first controller which controls to store data sent from said host computer ~~to~~ in a primary volume configured by ~~some of~~ said first disk drive units,

~~a storage volume for storing data;~~

a second disk array system, in a remote site, coupled to said first disk array system and having a plurality of second disk drive units in which data are stored and a second controller which receives data of said primary volume from said first disk array system with an asynchronous remote copy procedure and controls to store data received from said first disk array system ~~to~~ in a secondary volume configured by said second disk drive units,

a third disk array system, in a local site, coupled to said first disk array system and having a plurality of third disk drive units in which data are stored and a third controller which receives data of said primary volume from said first disk array system with a synchronous copy procedure and controls to store data received from said first disk array system ~~to~~ in a third volume configured by said third disk drive units,

a first area ~~means~~, in said third disk array system, for storing a plurality of write ~~history~~ histories of data written several times in the ~~storage~~ third volume as a first differential management table after a first time; and

a second area ~~means~~, in said third disk array system for storing ~~the~~ a plurality of write ~~history~~ histories of the data written into the ~~storage~~ third volume as a second differential management table after a second time subsequent to the first time~~.~~; and

a third area, in said first disk array system, being related to data written in said primary volume after the first time;

wherein said first disk array system transfers data related to said third area of said first disk array system from said first disk array system to said second disk array system with the asynchronous remote copy procedure after the second time.

8. (New) A storage system according to claim 7, wherein the third disk array system makes contents of data stored in the secondary volume consistent with contents of data stored in the third volume by using said first area and the third volume of said third disk array system in the event of a disaster that affects said primary site.

9. (New) A storage system according to claim 7, wherein said synchronous copy procedure is a copy style that said first disk array system sends acknowledge to said host computer after said third disk array system receives first data sent from said first disk array system, if said first disk array system receives said first data sent from said host computer.

10. (New) A storage system according to claim 7, wherein said asynchronous remote copy procedure is a copy style that said first disk array system sends acknowledge to said host computer without relation to that said second disk array system receives second data sent from said first disk array system, if said first disk array system receives said second data sent from said host computer.

11. (New) A storage system according to claim 7, wherein each of said write histories has information of a position in said third volume, said position in which data are written.

12. (New) A storage system according to claim 7, wherein said data transfer from said first disk array system to said second disk array system with said asynchronous remote copy procedure is acted on a periodic basis.

13. (New) A storage system according to claim 7, wherein said third disk array system sends data which relates to information stored in at least one of said first area and second area to said second disk array system, if said first disk array system has a disaster.

14. (New) A storage system according to claim 7, wherein said synchronous copy procedure is a copy style that said first disk array system sends acknowledge to said host computer after said third disk array system receives first data sent from said first disk array system, if said first disk array system receives said first data sent from said host computer, and

wherein said third disk array system stores said write history of said first data in said first area, if said third disk array system receives said first data sent from said first disk array system.

15. (New) A storage system according to claim 7, wherein said third disk array system transfers data related to said write histories after said first time from said third disk array system to said second disk array system, if said

first disk array system has a disaster during transferring data from said first disk array system to said second disk array system with an asynchronous remote copy.

16. (New) A storage system according to claim 7, wherein said third disk array system transfers data related to said write histories after said second time from said third disk array system to said second disk array system, if said first disk array system has a disaster after transferring data from said first disk array system to said second disk array system with an asynchronous remote copy.

17. (New) A storage system according to claim 7, wherein said third disk array system, by using said first area, can transfer lesser amount of data that needs to be transferred to said second disk array system than all data stored in said third volume, if said first disk array system has a disaster.

18. (New) A storage system according to claim 7, wherein said third disk array system can minimize amount of data that needs to be transmitted to said second disk array system by using said first area, if said first disk array system has a disaster.

19. (New) A storage system, comprising:

a first disk array system, in a primary site, coupled to a host computer and having a plurality of first disk drive units in which data are stored and a

first controller which controls to store data sent from said host computer in a primary volume configured by said first disk drive units,

a second disk array system, in a remote site, coupled to said first disk array system and having a plurality of second disk drive units in which data are stored and a second controller which receives data of said primary volume from said first disk array system with an asynchronous remote copy procedure and controls to store data received from said first disk array system in a secondary volume configured by said second disk drive units,

a third disk array system, in a local site, coupled to said first disk array system and having a plurality of third disk drive units in which data are stored and a third controller which receives data of said primary volume from said first disk array system with a synchronous copy procedure and controls to store data received from said first disk array system in a third volume configured by said third disk drive units,

a first area, in said third disk array system, for storing a plurality of write histories of data written in the third volume several times after a first time; and

a second area, in said third disk array system, for storing a plurality of write histories of data written into the third volume several times after a second time subsequent to the first time; and

a third area, in said first disk array system, is related to data written in said primary volume after the first time;

wherein said first disk array system transfers data, which are related to said third area of said first disk array system and correspond to said write histories in said first area of said third disk array system, from said first disk

array system to said second disk array system with the asynchronous remote copy procedure; and

wherein the third disk array system makes contents of data stored in the secondary volume consistent with contents of data stored in the third storage volume by using said first area and the third volume of said third disk array system in the event of a disaster that affects said primary site.

20. (New) A storage system according to claim 19, wherein said first area is a bitmap, and said second area is a bitmap.

21. (New) A storage system according to claim 19, wherein said synchronous copy procedure is a copy style that said first disk array system sends acknowledge to said host computer after said third disk array system receives first data sent from said first disk array system, if said first disk array system receives said first data sent from said host computer.

22. (New) A storage system according to claim 19, wherein said asynchronous remote copy procedure is a copy style that said first disk array system sends acknowledge to said host computer without relation to that said second disk array system receives second data sent from said first disk array system, if said first disk array system receives said second data sent from said host computer.

23. (New) A storage system according to claim 19, wherein each of said write histories has information of a position in said third volume, said position in which data are written.

24. (New) A storage system according to claim 19, wherein said data transfer from said first disk array system to said second disk array system with said asynchronous remote copy procedure is acted on a periodic basis.

25. (New) A storage system according to claim 19, wherein said third disk array system sends data which relates to information stored in at least one of said first area and second area to said second disk array system, if said first disk array system has said disaster.

26. (New) A storage system according to claim 19, wherein said synchronous copy procedure is a copy style that said first disk array system sends acknowledge to said host computer after said third disk array system receives first data sent from said first disk array system, if said first disk array system receives said first data sent from said host computer, and

wherein said third disk array system stores said write history of said first data in said first area, if said third disk array system receives said first data sent from said first disk array system.

27. (New) A storage system according to claim 19, wherein said third disk array system can minimize amount of data that needs to be

transmitted to said second disk array system by using said first area, if said first disk array system has said disaster.

28. (New) A storage system according to claim 19, wherein said third disk array system sends data which relates to information stored in at least one of said first area and second area to said second disk array system, if said first disk array system has said disaster.

29. (New) A storage system according to claim 19, wherein said third disk array system transfers data related to at least one of said write histories from said third disk array system to said second disk array system, if said first disk array system has said disaster during transferring data from said first disk array system to said second disk array system with an asynchronous remote copy.

30. (New) A storage system according to claim 19, wherein said third disk array system transfers data related to said write histories of said second area of said third disk array system from said third disk array system to said second disk array system, if said first disk array system has said disaster after transferring data from said first disk array system to said second disk array system with an asynchronous remote copy.

31. (New) A storage system according to claim 19, wherein said third disk array system, by using said first area, can transfer lesser amount of data that needs to be transferred to said second disk array system than all

data stored in said third volume, if said first disk array system has said disaster.